AFRL-AFOSR-UK-TR-2013-0009

Emotion and Social Network Perceptions: How Does Anger Bias Perceptions of Networks?

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EOARD Grant 11-3080

Report Date: March 2013

Final Report from 26 August 2011 to 23 February 2013

Air Force Research Laboratory
Air Force Office of Scientific Research
European Office of Aerospace Research and Development
Unit 4515 Box 14, APO AE 09421

REPORT DOCUMENTATION PAGE

Form Approved OMB No. 0704-0188

1. REPORT DATE *(DD-MM-YYYY)*	2. REPORT TYPE	3. DATES COVERED *(From – To)*
19 March 2013	Final Report	26 August 2011 – 23 February 2013

4. TITLE AND SUBTITLE

Emotion and Social Network Perceptions: How Does Anger Bias Perceptions of Networks?

5a. CONTRACT NUMBER

FA8655-11-1-3080

5b. GRANT NUMBER

Grant 11-3080

5c. PROGRAM ELEMENT NUMBER

61102F

6. AUTHOR(S)

Professor Martin J. Kilduff

5d. PROJECT NUMBER

5d. TASK NUMBER

5e. WORK UNIT NUMBER

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)

University of Cambridge
The Old School
Cambridge, United Kingdom CB2 1TN

8. PERFORMING ORGANIZATION REPORT NUMBER

N/A

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)

EOARD
Unit 4515 BOX 14
APO AE 09421

10. SPONSOR/MONITOR'S ACRONYM(S)

AFRL/AFOSR/IOE (EOARD)

11. SPONSOR/MONITOR'S REPORT NUMBER(S)

AFRL-AFOSR-UK-TR-2013-0009

12. DISTRIBUTION/AVAILABILITY STATEMENT

Approved for public release; distribution is unlimited.

13. SUPPLEMENTARY NOTES

14. ABSTRACT

We explore how anger influences perceptions of rival networks across two studies. In a lab experiment, we establish that anger, relative to neutral emotion, affects the extent to which people see others as more connected than they really are. In a field experiment, we replicate and extend these findings by showing that anger not only promotes exaggerated perceptions of rival network connectedness, but it also enhances the tendency to see the people in these networks as more homogeneous and group-like (entitative) than they may be in actuality. Thus, relative to neutral emotion, anger distorts network perceptions in such a way that people see their rivals and their rivals' allies as representing stronger coalitions than may actually be the case, a phenomenon we term the "false coalition effect."

15. SUBJECT TERMS

EOARD, Cultural Modeling, Behavioral Science, Social Networks, Emotion, Anger, Network Perception, Network Cognition

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18, NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT	b. ABSTRACT	c. THIS PAGE			Lisa Boyce
UNCLAS	UNCLAS	UNCLAS	SAR	24	19b. TELEPHONE NUMBER *(Include area code)* +44 (0)1895 616292

Emotion and Social Network Perceptions:

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FA8655-11-1-3080

The current research is scheduled for presentation at the 2013 Society for Industrial and Organizational Psychology Conference in Houston, Texas, and the 2013 International Network for Social Network Analysis (Sunbelt) Conference in Hamburg, Germany.

THE FALSE COALITION EFFECT:

ANGER BIASES NETWORK COGNITION

Abstract

We explore how anger influences perceptions of rival networks across two studies. In a lab experiment, we establish that anger, relative to neutral emotion, affects the extent to which people see others as more connected than they really are. In a field experiment, we replicate and extend these findings by showing that anger not only promotes exaggerated perceptions of rival network connectedness, but it also enhances the tendency to see the people in these networks as more homogeneous and group-like (entitative) than they may be in actuality. Thus, relative to neutral emotion, anger distorts network perceptions in such a way that people see their rivals and their rivals' allies as representing stronger coalitions than may actually be the case, a phenomenon we term the "false coalition effect."

Keywords: emotion, anger, social networks, network perception, network cognition

Competition in organizations creates powerful emotions, such as anger, that shape people's perceptions of others (Lerner & Tiedens, 2006). In these competitive contexts, people are often faced with having to form consequential perceptions about who could support their rivals, those who might seek to equal or outdo them. For example, consider the scenario that unfolded in Lehman Brothers, Kuhn, Loeb and Co. in the early 1980s. To relieve tensions between the firm's investment bankers and traders, CEO Pete Peterson promoted a former trader and the firm's president, Lewis Glucksman, to be co-CEO. Soon thereafter, Peterson and Glucksman found themselves in a power struggle, in which Glucksman claimed Peterson did not have the confidence of the partners and asked for his resignation. Peterson, angered yet unsure of the possible network of supporters behind his rival Glucksman, reluctantly relinquished control of the company to the person he had appointed as co-CEO only months before (Auletta, 2001; Geisst, 1997).

Recently, we have learned a significant amount about the role of anger in perception and decision-making processes (Carver & Harmon-Jones, 2009; Fischer & Roseman, 2007; Harmon-Jones & Allen, 1998; Lerner & Tiedens, 2006; Tiedens, 2001). For example, studies comparing people who experience anger versus a neutral emotion have shown that angry people tend to make greater stereotypical judgments (Bodenhausen, Sheppard, & Kramer, 1994) and forego reflection about others, relying instead on information that comes easily to mind (Lerner & Tiedens, 2006). However, research has yet to connect these insights to the question of how rival networks are perceived.

Cognitive network research has shown that people have difficulty discerning and remembering social ties (Kilduff, Crossland, Tsai, & Krackhardt, 2008; Krackhardt, 1987) and that people arrive at quite different pictures of the same network of relations (Krackhardt & Kilduff, 1999). Cognitive network research examining perceiver characteristics has focused on power (Simpson, Markovsky, & Steketee, 2011), personality (Casciaro, 1998;

Flynn, Reagans, Amanatullah, & Ames, 2006; Flynn, Reagans, & Guillory, 2010) and the benefits of having accurate network perceptions (Janicik & Larrick, 2005; Krackhardt, 1990). We know little about whether the powerful emotions that are triggered in the heat of competition shape our perceptions of social networks.

Drawing from cognitive network research (Janicik & Larrick, 2005; Kilduff & Tsai, 2003: 70-79) and theory about the role of anger in social perception (Lerner & Tiedens, 2006), we propose and test two ideas concerning how anger influences rival network perception. First, when people forego reflection and rely on preconceived notions about who is connected to whom, these notions lead them to see more network connections than actually exist (De Soto, 1960; Freeman, 1992). We reason, therefore, that because anger may diminish the likelihood of reflection, anger may also enhance perceptions of connectedness in rival networks. Second, in light of the link between anger and stereotyping (Bodenhausen et al., 1994), we further hypothesize that anger also leads perceivers to see the people in these highly connected networks as more group-like ("entitative"; Campbell, 1958; Igarashi & Kashima, 2011) and comprised of people with similar personalities (cf. Spencer-Rodgers, Hamilton, & Sherman, 2007). Together, this research stands to inform the emerging literature on rivalry (G. Kilduff, Elfenbein, & Staw, 2010) and contributes to the integration of theory on emotion, social cognition, and social networks.

Network Cognition

The networks within which people are embedded have significant consequences for people's ability to mobilize resources and coordinate action (Burt, 2005). A person at the periphery of a network with few ties to others is likely to be less successful in gaining political support than a prominent network broker with connections to several different groups of people that he or she can call to action.

In cognitive network research (mirroring social network research more generally – Burt, 1992; 2005) there is widespread interest in perceptions of brokerage and closure (Flynn, Reagans, & Guillory, 2010; Janicik & Larrick, 2005). Brokerage in the context in which we are interested involves many missing connections between people in the immediate network surrounding a rival whereas closure involves few missing connections between people in the immediate network surrounding a rival. These differences in perceptions of network structure have implications for whether a perceiver would see the rival as potentially able to summon political support from many disparate factions within an organization (in the case of a perceived open network with many structural holes) or see the rival as potentially able to build a cohesive coalition of people who all know each other (in the case of a closed network with few structural holes).

People who are able to discern missing relations between people in these open or incomplete networks tend to make better decisions concerning who can influence whom (Janicik & Larrick, 2005). Research also shows that people who are more accurate in understanding who advises whom in the political landscape of organizations are credited with reputational power from colleagues (Krackhardt, 1990). Thus, an accurate cognitive map of the informal pattern of relations among individuals at work is linked to greater social influence.

Anger and Rival Network Cognition

Although individuals may strive for an accurate understanding of the social and political landscape in organizations, the task of keeping track of social relations can be difficult (Kilduff, Crossland, Tsai, & Krackhardt, 2008; Krackhardt, 1987; Krackhardt & Kilduff, 1999). To compensate for this shortcoming, people tend to rely on preconceived notions (schemas) about how the social world is patterned.

Research on the learning of networks indicates that individuals learn more quickly to the extent that networks exhibit schematic properties such as reciprocity in friendship relations (De Soto, 1960). Indeed, individuals tend to "fill in the blanks" and insert missing social ties in order to bring their perceptions into line with their expectations concerning reciprocity and other schematic elements (Freeman, 1992). People are more likely to make errors concerning the *presence of ties that do not exist* than errors concerning the *absence of ties that do exist*. The lesson we take from studies of network perception and schematic processing is that people deal with the complexity in discerning network relations by applying the use of schemas that simplify their social world, often resulting in errors that involve inserting absent ties.

But who is likely to use such schemas? Research on anger and social cognition has found that anger is often associated with the use of heuristics, or mental shortcuts, in evaluating and judging social stimuli. For example, researchers have found that, compared to neutral emotion, anger leads people to rely on the superficial aspects of a message (Bodenhausen, Sheppard, & Kramer, 1994) and chronically accessible scripts (Tiedens, 2001). Such evidence suggests that anger promotes the use of strategies that simplify complex tasks. One such complex task is, we suggest, discerning the connections in a rival's network. Given that anger promotes simplification strategies, we expect angry people, relative to those who experience a neutral emotion, to see more relations in the rival network (owing to the schematic tendency to insert relations).

> *Hypothesis 1: Individuals in the anger condition will perceive significantly denser rival networks than individuals in the neutral condition.*

Following the hypothesis that anger promotes the schematic representation of rival networks, we might also expect anger to affect other important perceptions of the network itself. In social cognition research, a central question that arises is the extent to which a set of

individuals can be considered a group. Seeing a set of individuals as a group predicts stereotyping, and we know that some groups (e.g., a family) are naturally more group-like than others (e.g., executives; Spencer-Rodgers et al., 2007). In addition, recent research has linked the connectedness of a network to its perceived entitativity (Igarashi & Kashima, 2011). Yet research has yet to connect such insights to whether anger influences perceptions of network entitativity. Do people in the grip of anger also accentuate the extent to which they see rivals as a distinctive, unified group?

If anger is involved in the heuristic processing of social ties, leading to more simplified views of a rival network, then we might indeed expect such heuristics to be involved in whether people attribute group-like properties to the rival network. In light of the association between anger and stereotyping (Bodenhausen et al., 1994), people may see these networks as more group-like ("entitative"; Campbell, 1958; Igarashi & Kashima, 2011) and comprised of people with similar personalities (cf. Spencer-Rodgers, Hamilton, & Sherman, 2007). We therefore reasoned that anger may promote the tendency to invoke such stereotypic tendencies, seeing rival networks as more entitative and comprised of similar people.

> *Hypothesis 2: Individuals in the anger condition will attribute more group-like properties (entitativity and homogeneity) to rival networks than individuals in the neutral condition.*

Research Overview

The purpose of this research is to explore how perceptions of a rival's social network at work might be distorted by the experience of incidental anger. We investigated this association between anger and network perception in two experiments. First, we conducted a laboratory experiment in which individuals had to learn and recall a set of six network relations in one minute using an established network learning task (Janicik & Larrick, 2005;

Simpson et al., 2011). This experiment allowed us to examine the main effect of anger on network perception while controlling for the actual structure of the learned network. Second, we conducted a second experiment in which working professionals told us about their rivals at work, who would support them, and the nature of the connections among their rivals and their supporters while feeling either angry or a neutral emotion. This experiment allowed us to test the main effect of anger on rival network closure and properties of group perception including entitativity and homogeneity. Collectively, we term these hypotheses the "false coalition effect" – the tendency to see cohesion and group-like qualities as a result of anger.

EXPERIMENT 1: METHODS

Participants

We directed participants (N = 49) to our study website from an online recruitment pool of volunteers from Amazon Mechanical Turk. Previous research comparing North American undergraduate samples with Turk samples indicates that Turk respondents tend to be more demographically diverse, yet still provide responses that exhibit strong psychometric properties (Buhrmester, Kwang, & Gosling, 2011). Our sample consisted of 26 females and 23 males who were 59.18 years old on average (SD = 10.87) and completed the experiment online. To control for inattentive responding, we asked participants to answer true or false to the question, "I do not need oxygen to breathe." All participants answered false. We also monitored the time spent on each survey page, which resembled the amount of time spent by participants in pre-tests. Participants were paid $3 for volunteering.

Design and Materials

The experiment was a 1-way (anger or neutral emotion condition) between-subjects design with density (the number of perceived ties divided by the number of total possible ties) as the dependent variable. Participants were randomly assigned to an anger or neutral

condition. In the anger condition, participants watched a 4 min. 6 sec. clip from the movie My Bodyguard, which features a scene of a young male being bullied. This clip was chosen for its established capacity to elicit anger, which in previous research influenced the level of anger experienced by those who watched it relative to the neutral condition (Gross & Levenson, 1995). In the neutral condition, participants watched a clip of moving lines of approximately the same length. We chose not to ask participants to indicate the extent to which they felt angry because previous research suggests that labeling emotions may reduce their impact (Lerner & Keltner, 2000). However, in an independent pilot test, we found that individuals watching the My Bodyguard scene experienced significantly greater anger than individuals who saw the neutral clip.

Afterward, we instructed participants to complete a memory task, which involved learning six relationships among five actors in 1 min. (for the network learning task, see Janicik & Larrick, 2005). The network contains two reciprocated dyads and one triad containing a reciprocated dyad and two directed ties from a third person to both members of the reciprocated dyad. We emphasized that participants' compensation would not be tied to their performance on this task, but they should do their best to learn and recall the relationships among actors in the network as accurately as possible. In addition, we stressed that they should not write anything down. On the computer screen, participants had 1 min. to learn six ties between actors. Thereafter, the survey automatically advanced to the next page where they were given as long as they liked to report from memory the relationships they just learned. We recorded participants' recall times, which we used in covariance analyses reported below.

Results and Discussion

We anticipated that the experience of incidental anger would influence participants' ability to learn and recall the social ties among the actors presented to them. In particular, we

hypothesized that angry participants would be more likely to recall ties that did not exist, perceiving denser networks than participants in the neutral condition. To test this hypothesis, we submitted the density of each person's recalled network to a 1-way (anger or neutral condition) analysis of variance (ANOVA). The results of our analyses supported the prediction that anger influences perceptions of network density: Participants in the anger condition recalled on average greater density (n = 25, M = .36, SD = .09) than participants in the neutral condition (n = 24, M = .32, SD = .08), $F(1, 47) = 2.84$, $p < .05$, $\eta 2 = .06$. As a robustness check, we included the amount of time participants spent recalling the network as a covariate, which did not change the overall pattern of results.

These data provide initial support for the link between anger and distorted network perception. People tend to learn and recall denser networks than those who experience a neutral emotion. Although these results demonstrate the main effect of anger on network perception, we recognize several limitations. For instance, it is possible that the network learning task itself was easy enough for participants in the neutral condition to forego the use of heuristics. In larger networks, it may be more difficult to recall who is connected to whom, necessitating the need for heuristics irrespective of whether a person experiences anger or a neutral emotion. Does anger accentuate perceptions of network density even under conditions of greater cognitive load, where neutral-condition participants are also likely to forego reflection and use heuristics?

To examine this possibility, we recruited another sample of volunteers using the same procedures as before. However, we presented these participants with a network with eight connections instead of six, without increasing the amount of time allotted for learning these connections. Consistent with our prediction that anger would accentuate perceptions of network connectedness, we found further support for our hypothesis, such that anger-condition participants recalled on average greater density (n = 27, M = .44, SD = .14) than

neutral-condition participants (n = 27, M = .38, SD = .13), $F(1, 52) = 3.17$, $p < .05$, $\eta^2 = .06$. This difference remained significant in follow-up analyses controlling for the possible confounding effects of time spent recalling the network. Thus, although participants in both conditions may have relied on heuristics when learning and recalling network connections, participants in the anger condition were especially likely to do so and accentuated their perceptions of who influenced whom among the five actors.

In the foregoing experiments, we established the main effect of anger on network perception, but several questions remain. First, does the influence of anger on network perception extend to settings where people have a shared history with the individuals whose relationships they are asked to recall? Second, does anger shape perceptions of *rival* networks in particular? Finally, how does anger influence perceptions of the people in the network immediately surrounding a rival, such as the extent to which they are seen as a distinctive, unified group? Figure 1 shows the predicted effect of anger on perceived rival network density, entitativity, and homogeneity. We examine these questions in a follow-up study of anger and rival network perception in a sample of working professionals.

Insert Figure 1 about here

EXPERIMENT 2: METHODS

Participants

Participants were recruited from a respondent panel assembled by a professional survey firm (Qualtrics). To qualify for the experiment, participants had to be working full-time in a professional (knowledge-intensive) job. Participants (N = 109) were 58.32 years old on average (SD = 7.63), 56 were female, and most participants (84.4%) had at least a four-year college degree.

Design and Materials

The experiment was a 1-way (anger or neutral condition) between-subjects design. We adapted an emotion-induction procedure used in previous research on anger (see Lerner & Keltner, 2001, p. 153). In the anger condition, we instructed participants as follows: "Think about the people you have met and interacted with at work. In these interactions, please briefly describe three to five things that make you, or have made you, most angry." On the next page, we then asked participants: "Please describe in more detail the one person at work who makes you, or has made you, most angry. Write your description so that someone reading it might even get mad. Please write at least 4-5 sentences." In the neutral condition, we asked, "Please think about your day yesterday. Please briefly describe three to five things you did." We checked each essay to ensure that participants followed instructions.

On the next page, participants were asked "to think of whom they considered a rival at work. A rival is someone who is competing for the same object or goal as you, or tries to equal or outdo you. Write one or two sentences about why you consider this person a rival." We screened responses to ensure that all participants retained in the following analyses identified an actual rival at work.

Rival network perceptions. To capture perceptions of the rival network, we adopted the ego network method (Wasserman & Faust, 1994) that involves assessing the network surrounding an actor (ego) from the sole perspective of the participant. We chose this method because we wished to examine the effect of anger on *perceptions* of the rival network, for which the ego network method is well suited. Specifically, we asked, "Which individuals would your rival call upon in the event that you had a conflict with him or her? Please write their names below." We asked participants to provide the names of at least two individuals, and we measured the number of individuals in the rival network to control for the possibly

confounding effects of network size on network density in our hypothesis tests (networks become less dense with size; Wasserman & Faust, 1994).

After participants reported the individuals in their rival's network, they then proceeded to a new page where they were asked to indicate which individuals in their rival's network would call upon each other in the event of a conflict with someone else. We chose this question to assess the degree of connectedness among the people in the rival network. Each participant's responses to the network questions allowed us to construct an adjacency matrix consisting of the participant's rival and the connections among his or her perceived supporters. We computed density on these networks as the number of perceived ties divided by the total number of possible ties.

Rival network perceptions. Research on the stereotyping of social groups has produced a number of constructs that are important for understanding the "group-ness" of a collection of individuals. One important construct concerns entitativity, or the "degree to which members of a group are perceived as being a coherent social unit" (Spencer-Rodgers et al., 2007, p. 370). In addition, we were also interested in the extent to which participants saw the people in rival networks as being highly similar in terms of personal characteristics (homogeneity). We adopted a 9-point Likert scale ranging from 1 (not at all) to 9 (to a great extent) to assess these two aspects of rival network perception.

Entitativity. We assessed entitativity with eight items adapted from the Spencer-Rodgers et al. (2007) entitativity measure. Items were reworded so that they applied to individuals in the rival network. Example items included, "To what extent would the individuals in your rival's network qualify as a 'group'?" "To what extent are the individuals in your rival's network organized?" and "To what extent are the individuals in your rival's network cohesive?" The items exhibited strong internal consistency ($\alpha = .92$) and loaded on a single unrotated factor explaining 61.45% of the total variance.

Homogeneity. We captured homogeneity by adapting the four-item homogeneity measure found in Spencer-Rodgers et al. (2007) to the case of rival networks. Example items were, "To what extent are these people similar in terms of personality characteristics?" and "To what extent are these people similar in terms of behaviors?" The items were internally consistent ($\alpha = .88$) and loaded on a single unrotated factor explaining 75.06% of the total variance.

Results and Discussion

We hypothesized that anger would have an effect on rival network perception, such that anger would lead participants to (a) perceive rival networks as denser and (b) judge their rival's network as more entitative and homogeneous. To test these hypotheses, we conducted a 1-way (anger or neutral emotion) multiple analysis of covariance (MANCOVA) with perceived rival network density, entitativity, and homogeneity entered as dependent variables and network size entered as a control variable.

Do angry individuals see their rival's network as more internally connected and group-like than individuals in a neutral state? We found a significant multivariate effect of anger on the three dependent variables, $F(3, 104) = 4.74$, $p < .01$ (Wilks' $\lambda = .88$, $\eta^2 = .12$). Relative to participants in the neutral emotion condition ($n = 57$, $M = .32$, $SD = .19$), participants in the anger condition activated significantly denser networks ($n = 52$, $M = .41$, $SD = .25$), $F(1, 106) = 4.53$, $p < .05$.

People in the anger condition also saw their rival's network as more group-like and internally similar. Compared to the neutral condition, participants in the anger condition viewed their rival's network as more entitative (*M*s = 39.02 vs. 44.58), $F(1, 106) = 3.96$, $p < .05$, and homogeneous (*M*s = 16.70 vs. 20.83), $F(1, 106) = 9.72$, $p < .01$. These differences are shown in Table 1. Our hypotheses concerning the role of anger in distorting perceptions

of network density and judgments of group-like properties of the rival network were each significant and in the predicted direction.

Insert Table 1 about here

In this research we have explored the micro-foundations of rivalry and network perception as a phenomenon shaped by the emotion state of the perceiver and the prior knowledge (schemas) he or she brings to bear on the perception of a set of social ties. Our findings suggest that, relative to neutral emotion, anger promotes the tendency to see others' social networks as denser, and to describe the individuals in these networks as more homogeneous and group-like (entitative).

GENERAL DISCUSSION

These studies provide consistent evidence that anger distorts network cognition. In Experiment 1, we found that anger, relative to neutral emotion, led people to learn and recall networks with greater density. This effect occurred even when we increased the difficulty of learning who was connected to whom. In Experiment 2, we constructively replicated and extended these results in a sample of working professionals who reported their rivals at work by showing that anger influences perceptions of rival network connectedness, and also the extent to which these rival networks are seen as being a distinctive, unified group comprised of highly similar people.

Theoretical Contributions

This research advances our theoretical understanding of social network cognition. Building on recent cognitive network research that illuminates how people activate different parts of their network in response to environmental pressures (Smith, Menon, & Thompson, 2011), we show that emotion shapes how network ties are perceived. We also extend research

on network cognition to questions concerning the composition of the network itself. Anger, relative to neutral emotion, exaggerates the extent to which people see rival networks as group-like and comprised of highly similar people.

Implications

These results have important implications for theory and practice on emotion, social cognition, and social networks. First, although many researchers often treat social network ties as if they exist independently of the perceiver, our results indicate that the structure of the connections surrounding a person is shaped by anger. Specifically, anger leads people to see networks as denser than they really are. Second, the link between emotion and network cognition has heretofore been neglected, and our research connects social cognition research on emotion and stereotyping (e.g., Lerner & Tiedens, 2006) to studies of social connections and the factors that influence the perception thereof (e.g., Janicik & Larrick, 2005; Krackhardt & Kilduff, 1999). Third, as individuals in organizations face off with rivals, it is important to note that their perceptions of who will support whom are influenced by their emotions. We underscore the importance of this finding for political contests, nations at war, or feuds between major players in corporations.

Boundary Conditions and Future Directions

The present research carries certain limitations and opportunities for further research. The present research is limited in that we have not investigated network perceptions within a bounded organizational setting. Follow-up research could identify whether or not perceptions of rivalry and distortions concerning network connections are shared among those with rivals in common. Although we know that network structure is consequential for a wide array of outcomes (Burt, 2010; Kilduff & Tsai, 2003) and network perceptions are important sources of reputational power and influence in organizations (Janicik & Larrick, 2005; Krackhardt,

1990), *rival* network perception per se has not been investigated in conjunction with these or other outcomes. Future research may wish to explore the specific ramifications of distorted rival network perception.

Conclusion

The motivation to get along and get ahead in organizations and in life is often complicated by the presence of colleagues who are in competition with us for prizes that only a few will attain. As our research shows, how we evaluate our rivals and the people who support them takes a different form depending on whether one is angry. We hope that as research moves beyond treating social ties as objective entities, scholars will recognize the importance of anger and other emotions for understanding how the networks of our enemies, competitors, and rivals are perceived in organizations. If the current research has one overriding message it is that the networks we perceive reflect in part the emotions we experience.

TABLE 1

Perceptions of the Rival Network by Emotion Condition

	Anger (n = 52)		Neutral (n = 57)	
	M	*SD*	*M*	*SD*
Density	.41	.25	.32	.19
Entitativity	44.58	12.31	39.02	15.90
Homogeneity	20.83	7.40	16.70	7.24

Note. All means significantly different at $p < .05$.

FIGURE 1

Differences in Rival Network Perception by Emotion

Rival Network When **Angry**	Rival Network When **Neutral**
More Entitative	Less Entitative
More Homogeneous	Less Homogeneous

Figure 1. Schematic of the differences in rival network perception by emotion. Note that actual network densities are merely illustrative.

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